

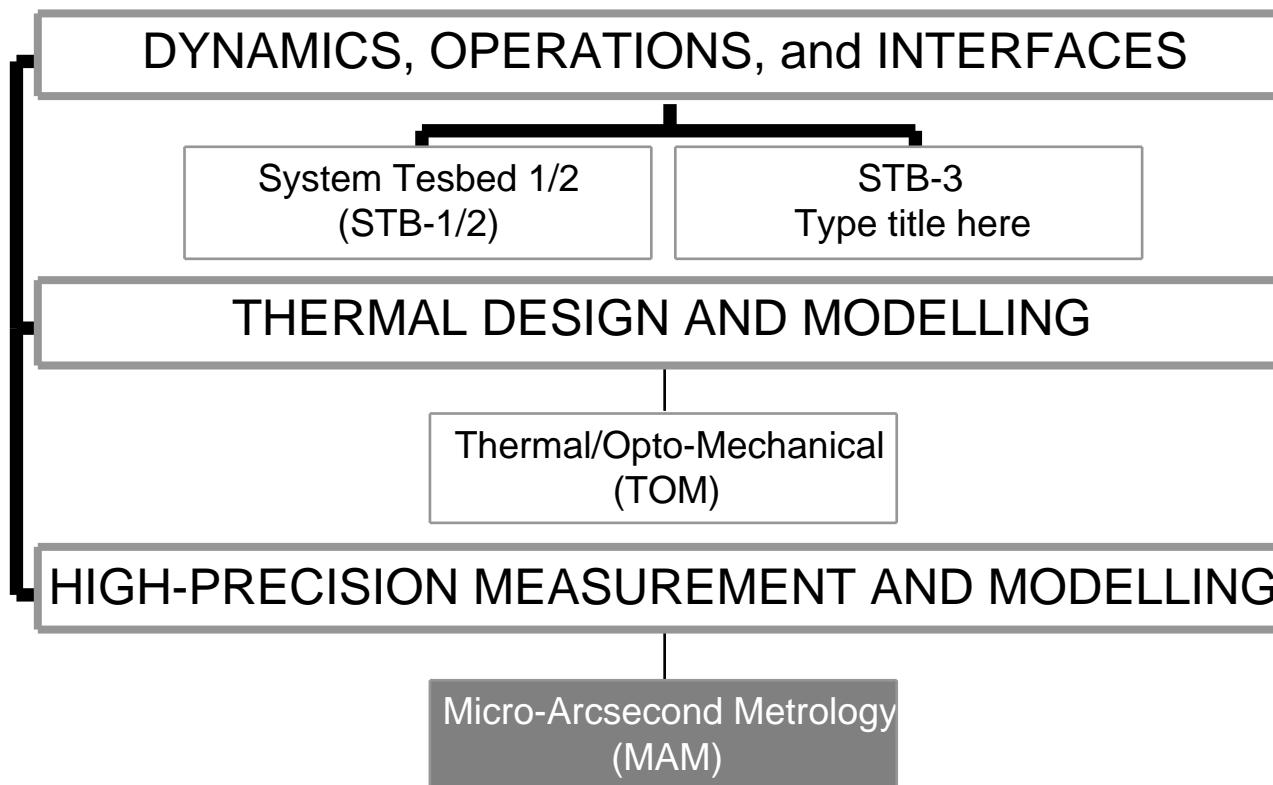
The Micro-Arcsecond Metrology Testbed

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JPL Testbeds for SIM



Micro-Arcsecond Metrology (MAM) Testbed

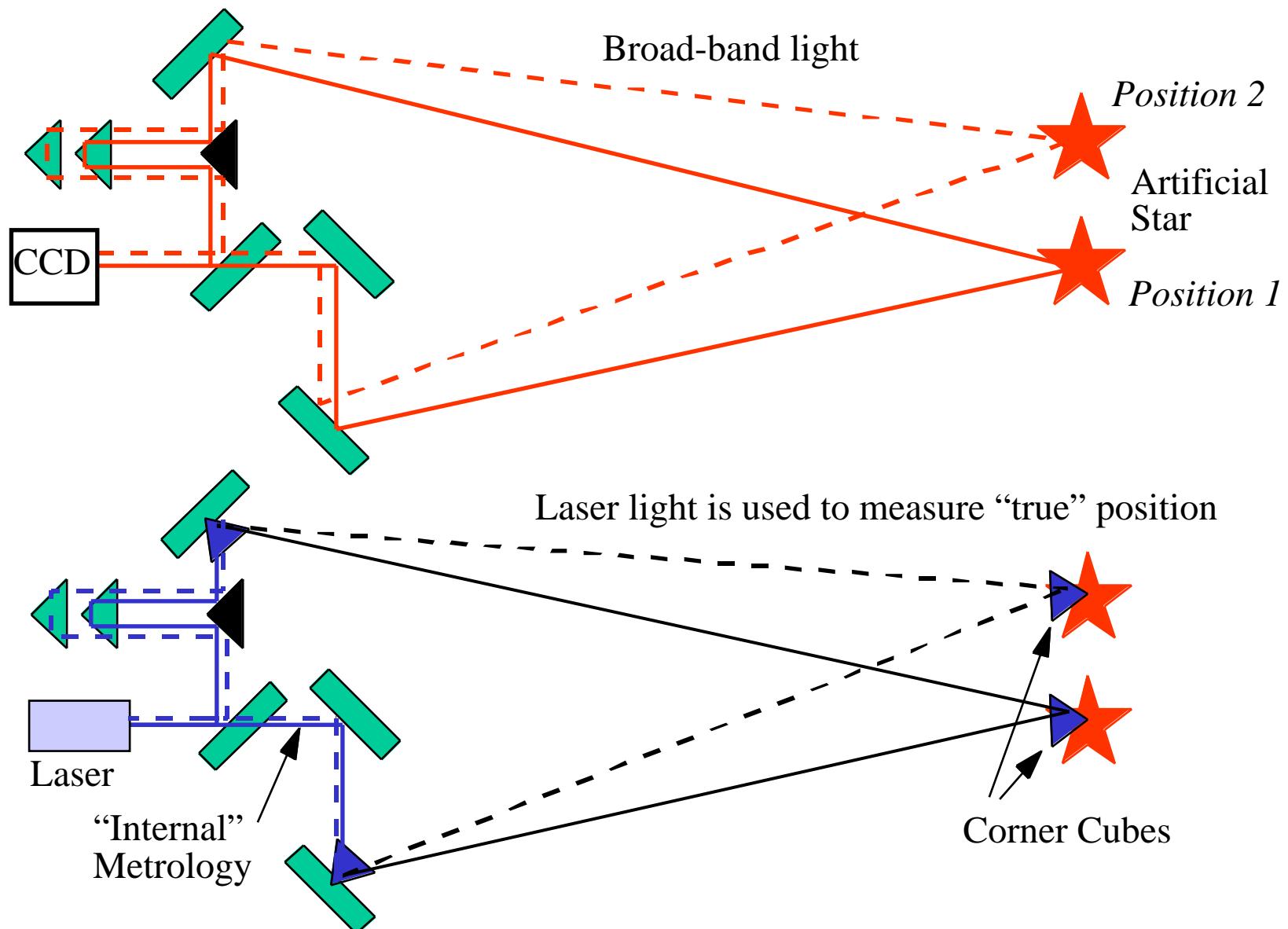
MAM is a SIM-like interferometer testbed that will demonstrate micro-arcsecond astrometric measurement of an artificial star.

MAM is designed to achieve the same precision in white-light fringe detection and metrology gauge performance as SIM.

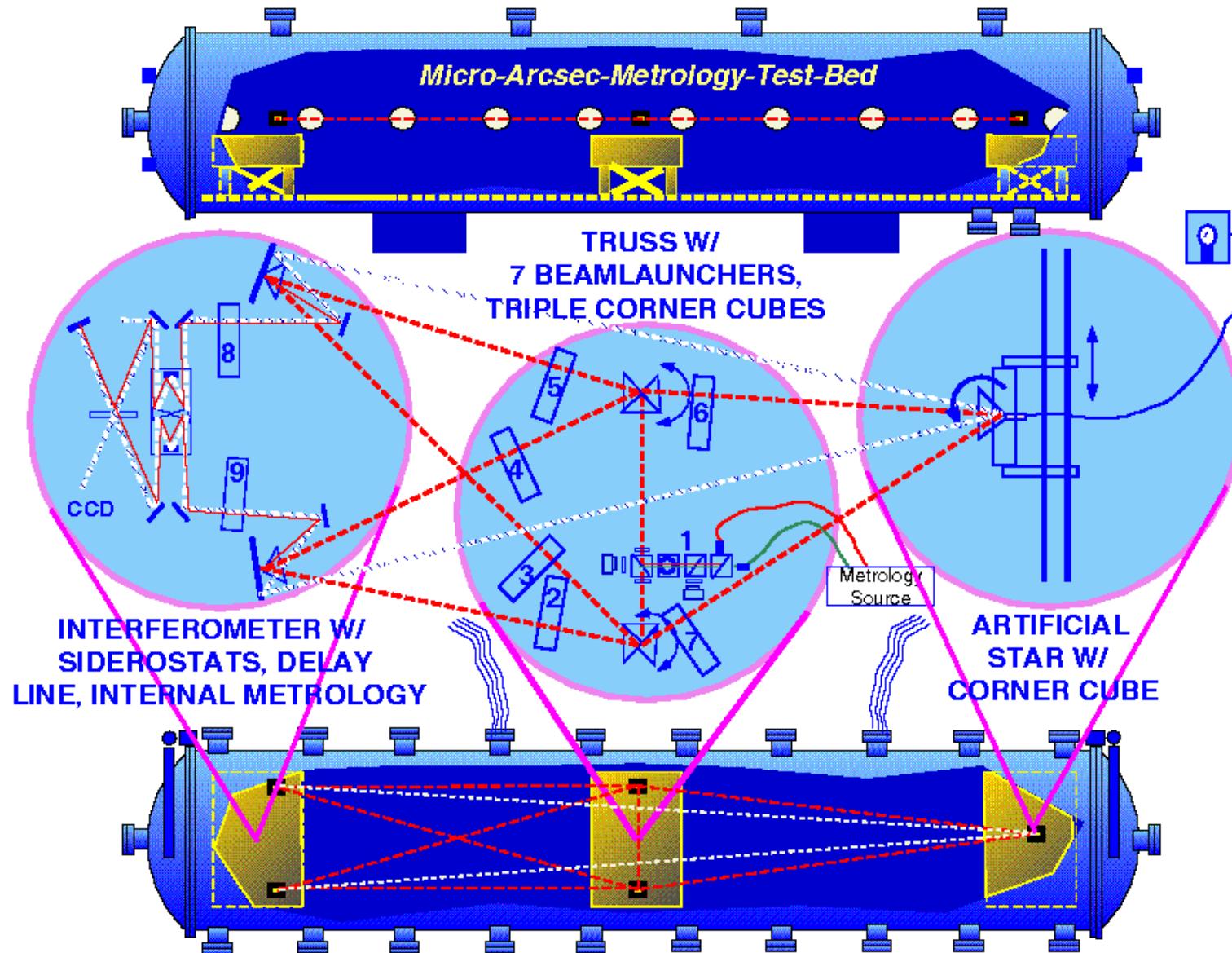
Testbed Objectives

- Combine white-light and laser metrology systems in a scale-version of a SIM baseline.
- Experimentally demonstrate key SIM error budget requirements can be met.
- Provide inputs to modelling tools.
- Verify integrated modelling tools.
- Provide a facility for well-controlled vacuum testing of critical SIM components.

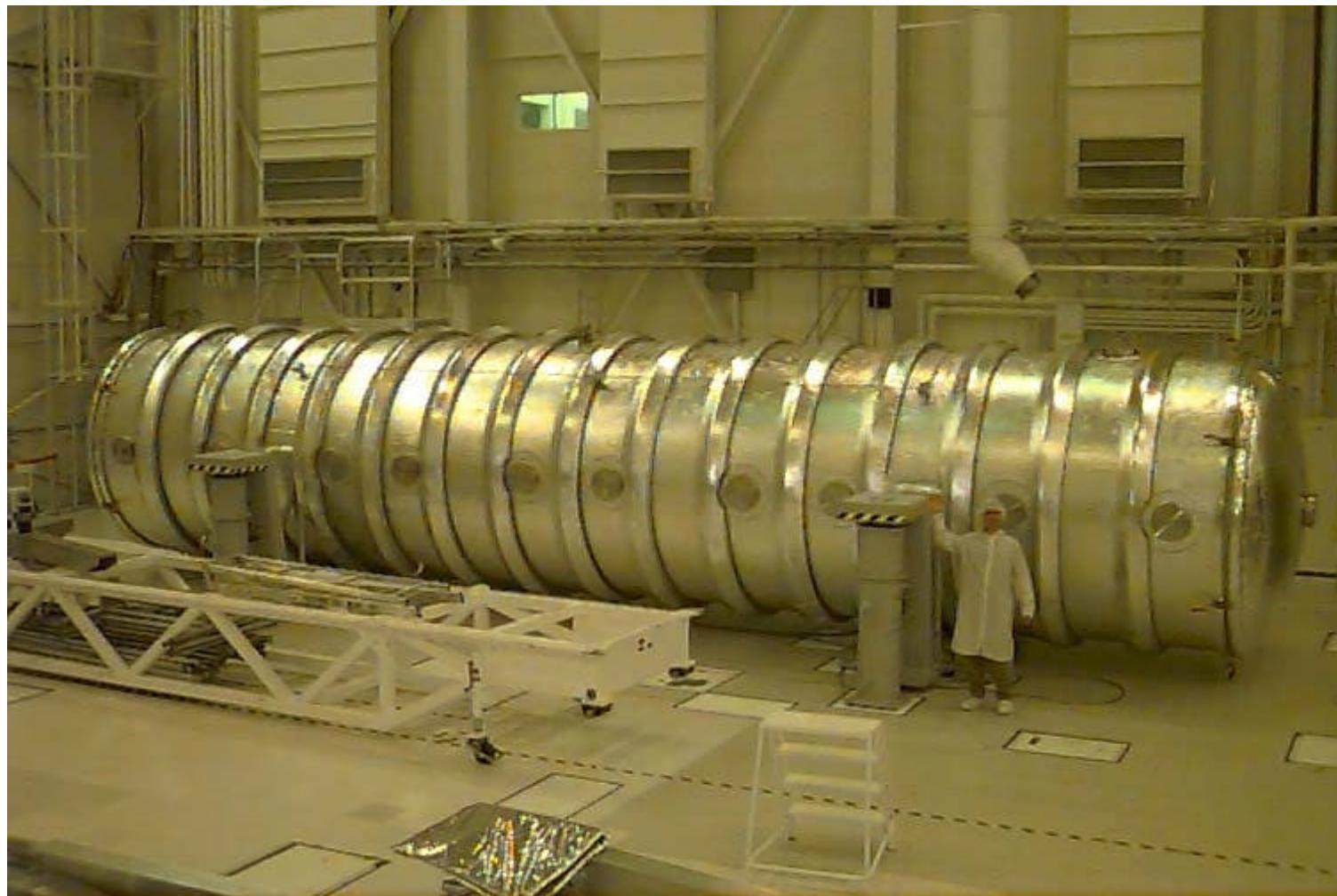
Conceptual Design



Implementation



Micro-arcsecond Metrology Testbed

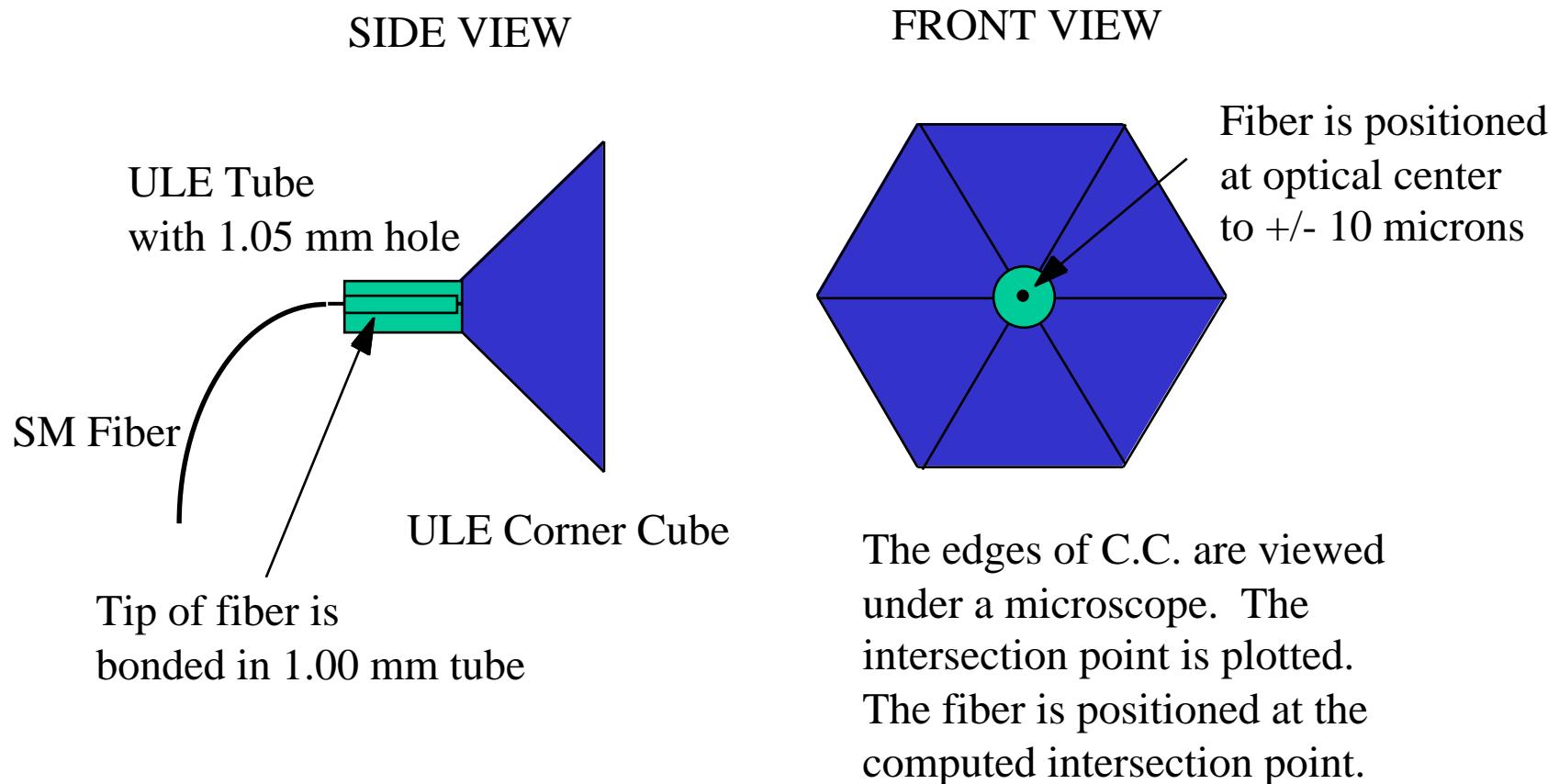


MAM Architecture

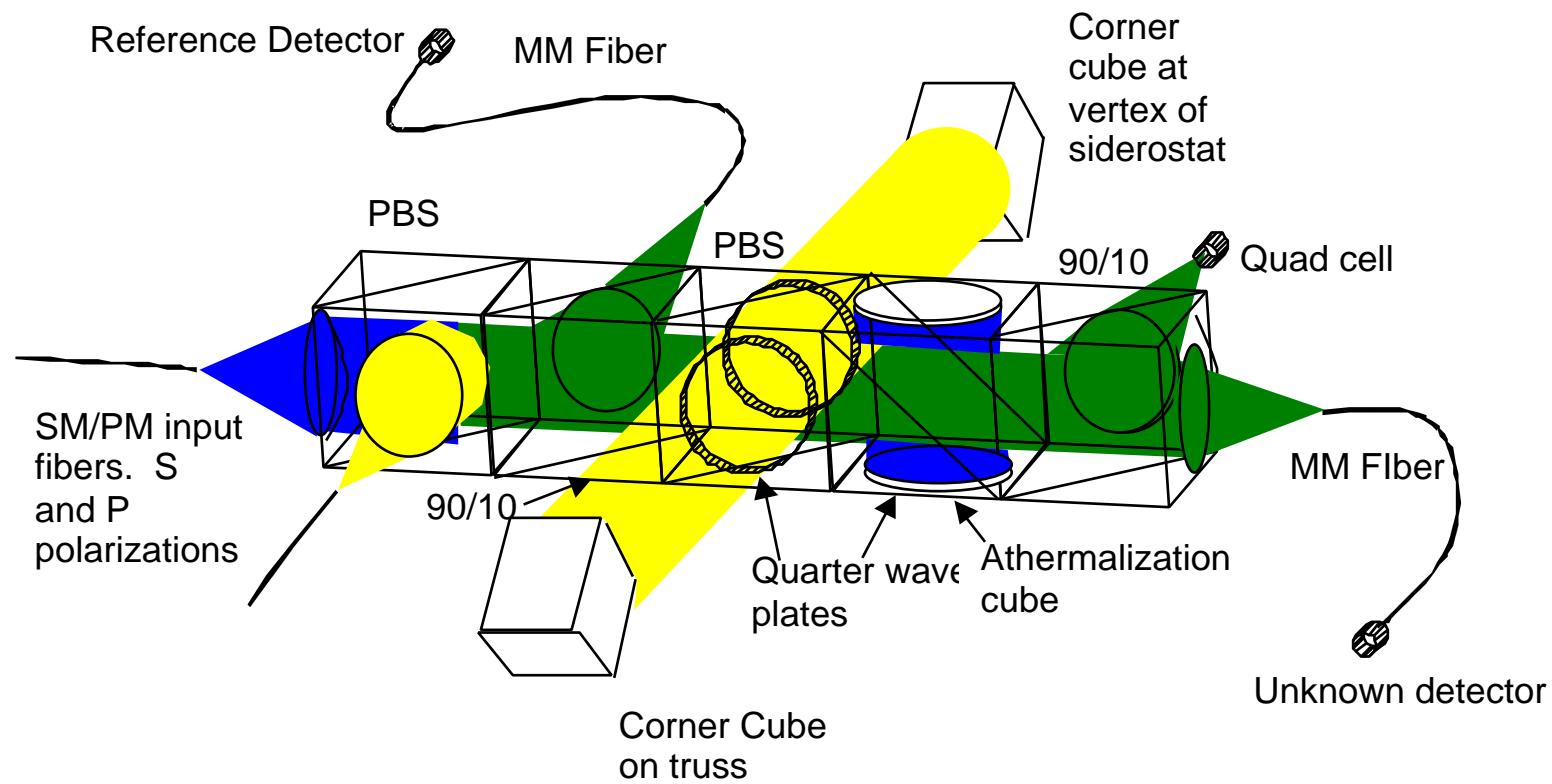
- MAM is a 2-dimensional analog of SIM.
- Initially, it has one baseline, one external metrology truss element, and it looks at one star.
- MAM has same functions as SIM: internal metrology, white-light angle tracking & fringe tracking.
- MAM is in a thermally stable and vibration-isolated environment.
- The experiment addresses the most critical part of the SIM error budget: astrometric measurements.

MAM Artificial Star

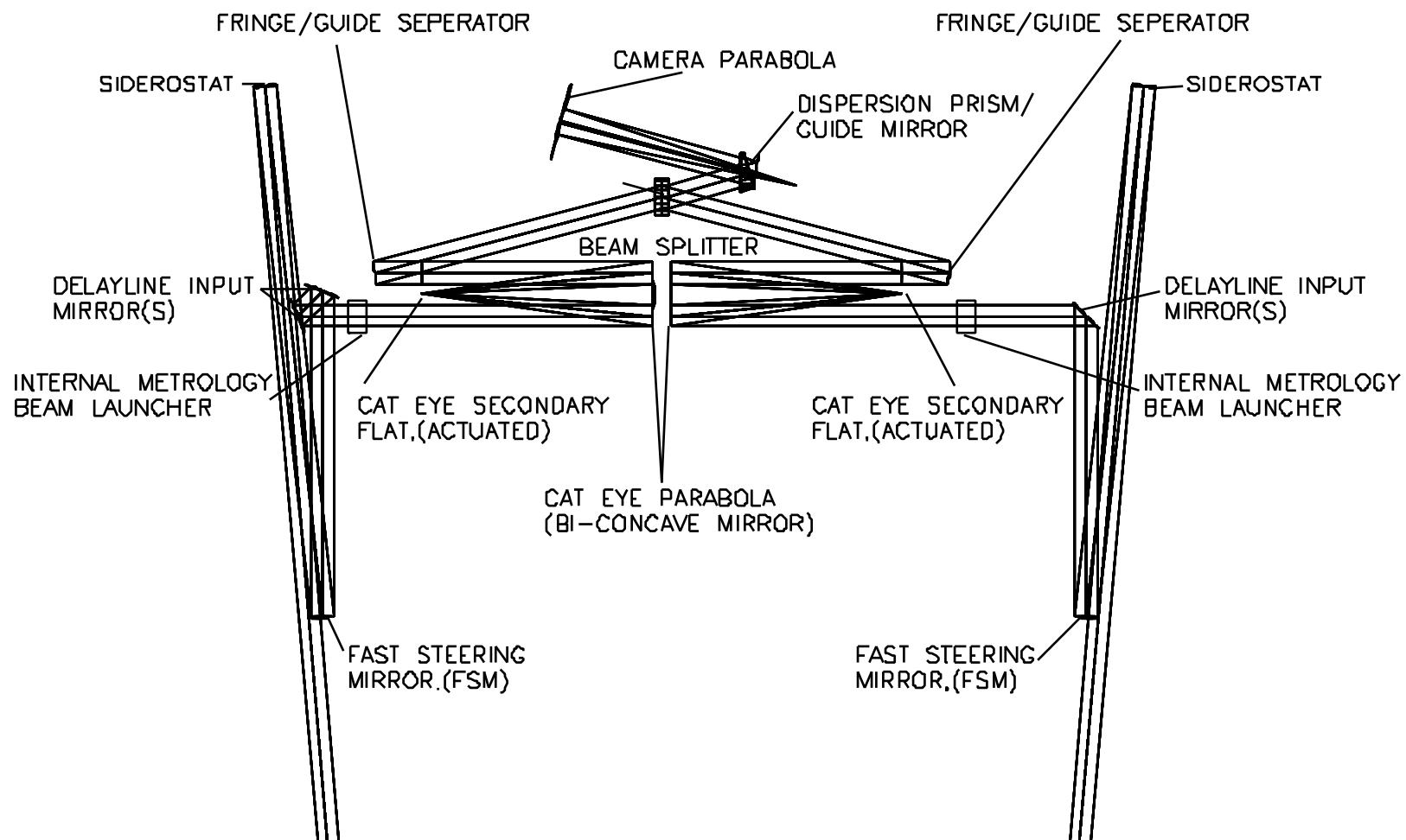
*A true point source is required without intervening optics: a single-mode fiber is used.
The corner cube provides an independent means of determining the star's position.*



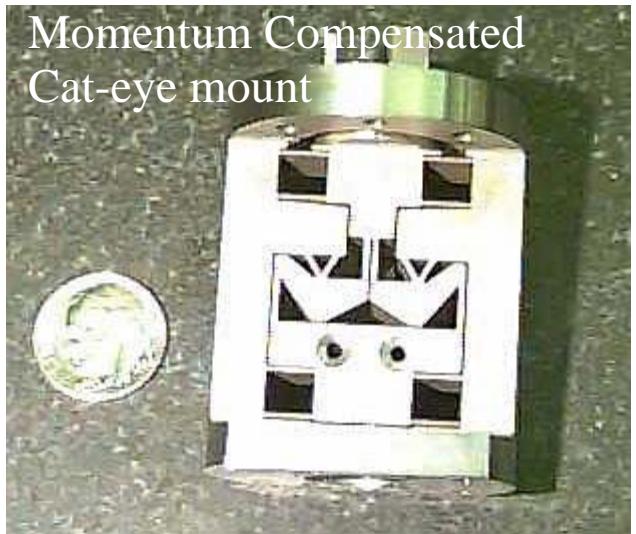
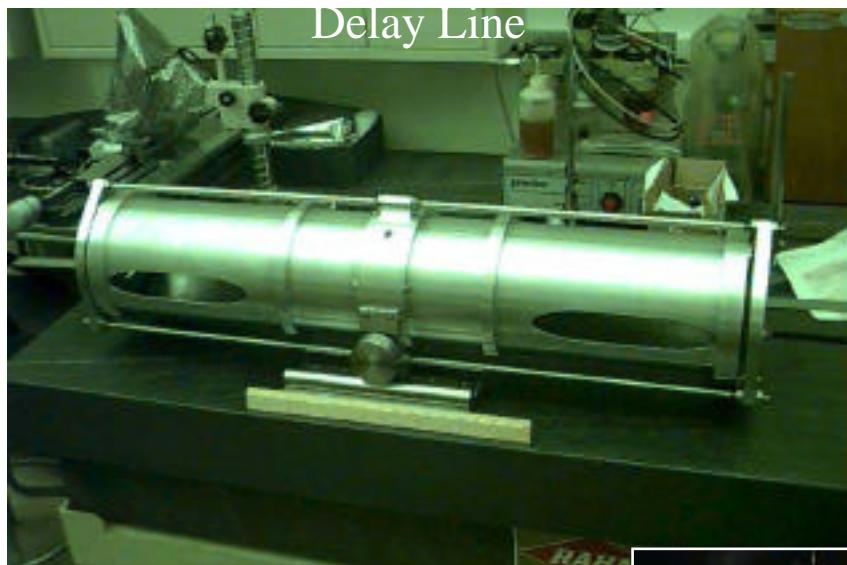
MAM BEAM LAUNCHER



MAM TESTBED INTERFEROMETER

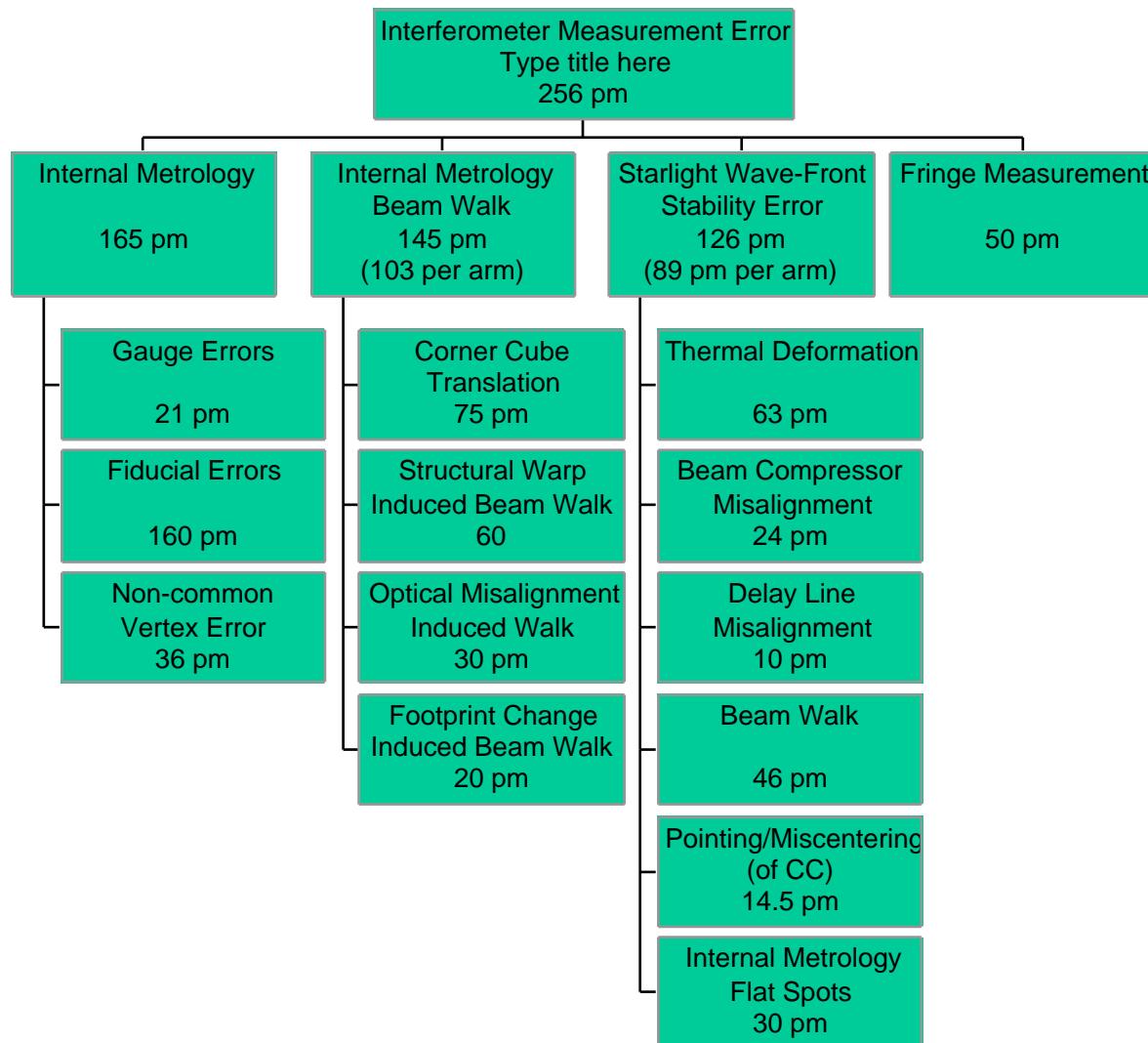


MAM Hardware 3/12/98



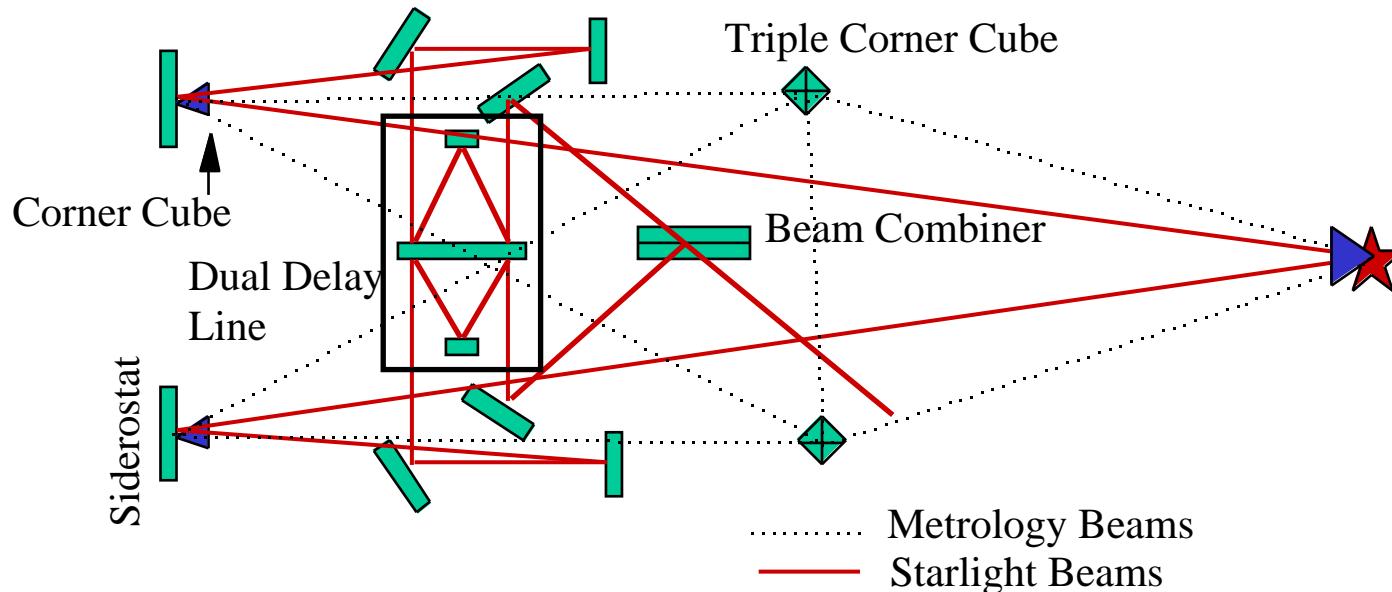
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Error Budgets

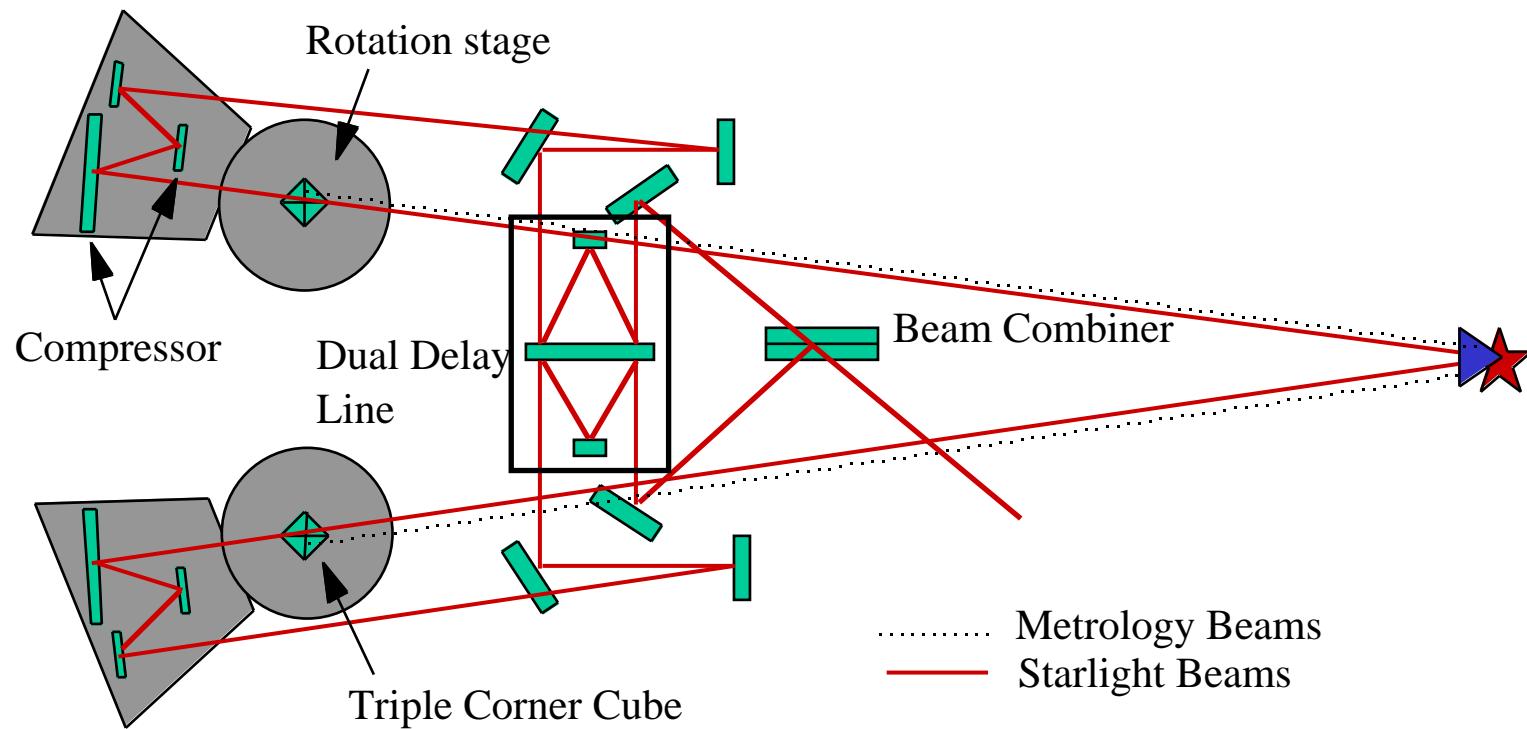


The Current MAM Design

- The MAM front end is in the old SIM configuration.
 - corner cubes mounted in siderostats, small-range FSM
- The MAM beam combiner is in the new SIM configuration.
 - dual delay line, simple feed to beam combiner



MAM in the new SIM configuration



Related Papers at this Conference

- A. Carlson *et al* : MAM Interferometer Optics
- A. Kuhnert *et al* : MAM Metrology System
- E. Schmidtlin *et al* : Multiple-faceted Fiducials for Interferometers
- Y. Gursel : Metrology V (3-D Metrology)